GROWTH MANAGEMENT PLAN

2009 Traffic Monitoring Program

Prepared for:

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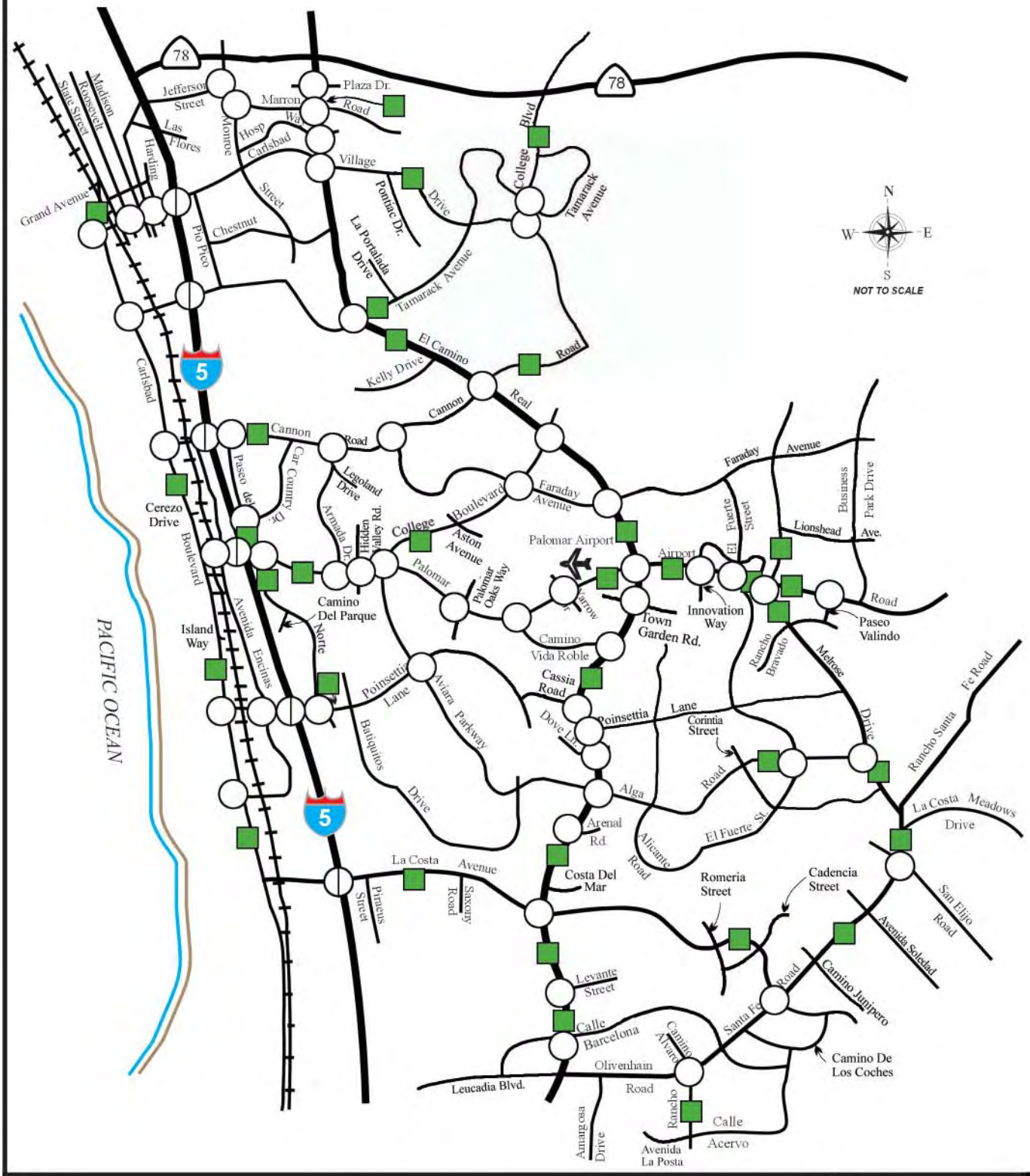
1. INTRODUCTION

PROJECT OVERVIEW

In attempts by cities across the country to manage growth within their communities, Growth Management Plans have been developed. An important part of a Growth Management Plan is a Traffic Monitoring Program. The Traffic Monitoring Program entails the collection and analysis of data at critical mid-block link count locations and major intersections throughout the community. Typically, data requirements for Traffic Monitoring Programs include the average daily traffic volumes recorded at mid-block locations and peak hour turn movement counts at major signalized and unsignalized intersections. The field data is then reduced and capacity analysis is performed based on existing geometrics and lane configurations. The analysis of intersections and mid-block link locations enables the jurisdiction to identify potential capacity problem areas where unacceptable operations exist or may become problematic in the future. This information is intended to assist the City of Carlsbad in assessing future development adjacent to these existing or future problem locations where capacity deficiencies currently exist and the mitigation measures that may be required to eliminate the deficiency.

This report documents the twenty-first year's results of the Growth Management Plan Traffic Monitoring Program for the City of Carlsbad. The City of Carlsbad identified sixty-seven (67) key intersections and thirty-four (34) key mid-block link locations for analysis. Similar efforts occurred for years 1989-2008 during June, July and August that provided a basis for comparison.

The City of Carlsbad is a coastal community located in Southern California, 35 miles north of San Diego, and the current population is approximately 105,000. Interstate 5 runs north and south near the western edge of Carlsbad and is a major route for commuters to both Orange County and San Diego. The facility also carries a significant amount of through traffic as the primary coastal route linking San Diego to Orange County and Los Angeles. The Carlsbad Circulation system includes the following arterials: El Camino Real, Palomar Airport Road, La Costa Avenue, Rancho Santa Fe Road, Carlsbad Boulevard, and Melrose Drive. The project location map, **Figure 1-1**, shows the alignment of the major roadways throughout Carlsbad and the intersections and mid-block link locations evaluated in this year's Traffic Monitoring Program.



2009 PROJECT LOCATION MAP

Figure 1-1

10/30/2009

Legend:

○ Intersection Count Location

■ Mid-Block Count Location

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ANNUAL REPORT ORGANIZATION

Rick Engineering Company collected data during the Summer of 2009 at requested mid-block link locations and intersections within and adjacent to the City of Carlsbad. The results of this data collection effort are included in the appendix at the end of this report. In addition to the technical appendix, Rick Engineering Company has prepared a summary section for this Annual Report. Summary information is presented in this initial section of the report, and a description of the contents of Chapters 2, 3 and 4 is provided below.

As mentioned previously, a total of thirty-four (34) mid-block link count locations were identified by the City of Carlsbad for the collection of 2009 average daily traffic (ADT) volume counts. Rick Engineering Company coordinated the placement of its counters with City staff and later reviewed the ADT volumes and performed roadway segment analyses. The results of the mid-block link analysis for the Summer count period are contained in Chapter 2.

Although mid-block link analysis provides a good indication of roadway operations in rural settings, intersections tend to be the dominant factor in traffic operations within the urban sections of most communities. Thus, the City of Carlsbad identified sixty-seven (67) key intersections to be analyzed. AM (6:00 to 9:00 AM) and PM (3:30 to 6:30 PM) peak period turn movement volumes were collected at each project intersection. The data was reduced to identify the peak hour turn movement volumes and approach delays, and this information was then analyzed using the Intersection Capacity Utilization (ICU) method for signalized intersections. The results of the intersection data collection and analysis activities are presented in Chapter 3.

Critical project findings and conclusions are documented in Chapter 4. Technical issues are discussed and recommendations for future traffic monitoring activities are also presented in Chapter 4.

2. MID-BLOCK LINK COUNTS

Mid-block link counts were conducted at thirty-four (34) locations throughout the City of Carlsbad and can be identified on **Figure 2-1**. Rick Engineering Company conducted the link counts using mechanical tube counters that were placed and monitored for two consecutive days (48-hours). The counts resulted in the determination of average daily traffic (ADT) volumes, and these ADT volumes for the Summer count period are summarized in the Appendix. The City of Carlsbad assumes a one-direction maximum capacity of 1,800 vehicles per lane, per hour, in the peak period. Mid-block link analysis was calculated by a maximum one-direction lane volume to capacity ratio.

The 2009 midblock lane volume to capacity ratio was correlated to the level of service for the thirty-four (34) midblock locations as follows:

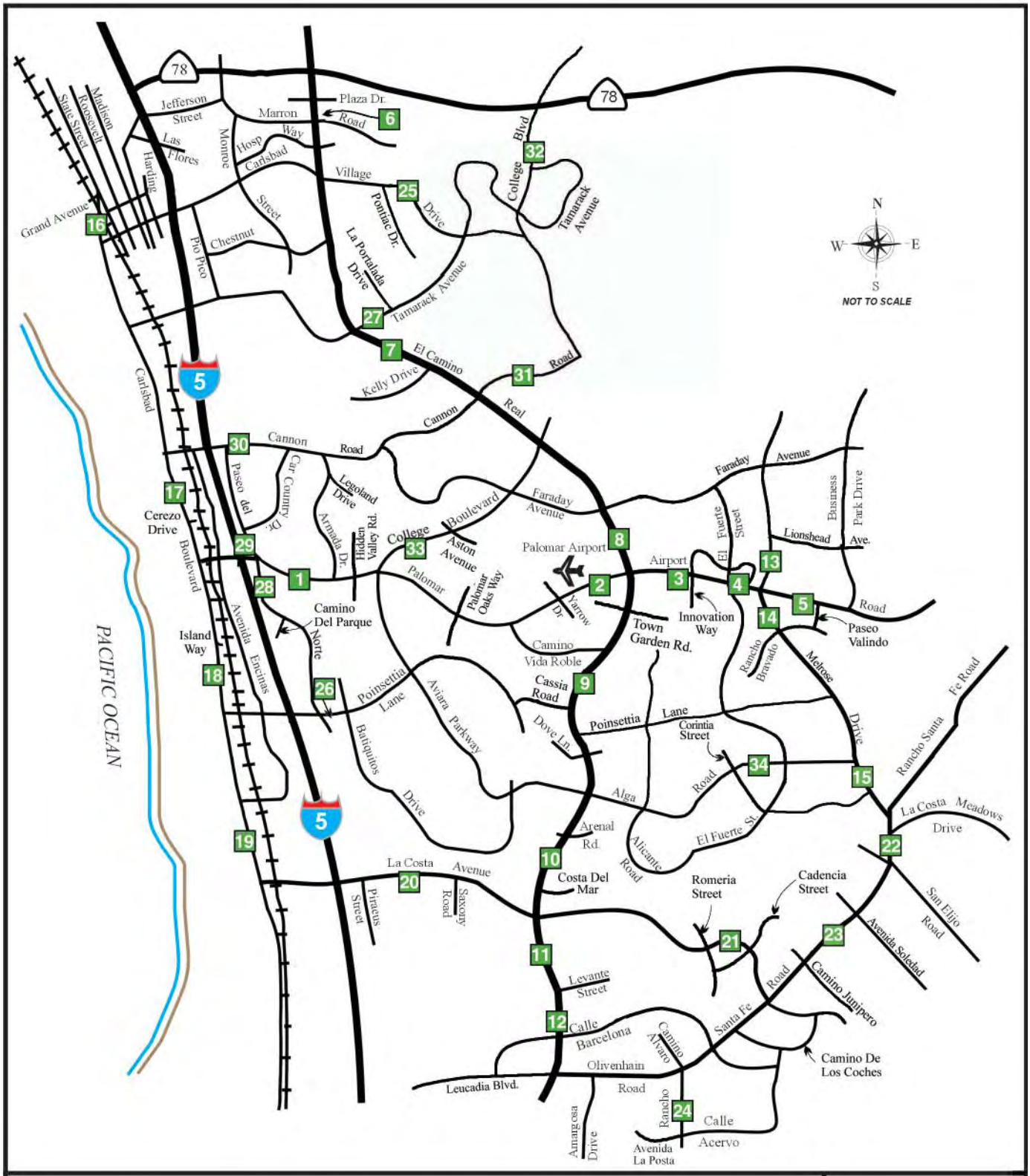
MIDBLOCK LINK COUNT
LEVEL OF SERVICE RANGES

Ratio	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E
Greater than 1.00	F

Figure 2-1 graphically illustrates the 2009 levels of service during the peak hour. **Table 2-1** summarizes and compares the Summer 2009 mid-block link analysis with data from 2005, 2006, 2007 and 2008.

Based on the results of the mid-block link analysis, all locations operated at LOS A for the Summer 2009 count program. There were no locations identified as operating at LOS B, C, D, E or F.

The volumes along Palomar Airport Road east of El Camino Real have continue to show a decrease due to the openings of the northerly extension of Melrose Drive at the intersection of Palomar Airport Road, which was completed shortly after the traffic counts were conducted for the 2006 count season and the recent extension of Faraday Avenue from Orion Way to Melrose Drive. A decrease of about 5% from the previous year was calculated. The volumes along Carlsbad Boulevard showed an increase from the previous year (about 7%).



2009 MID-BLOCK LINK LEVELS OF SERVICE

Figure 2-1

10/30/2009

Legend:

- Mid-Block Count Location
- LOS A, B, or C
- LOS D
- LOS E
- LOS F

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Table 2-1

CITY OF CARLSBAD
MID-BLOCK LINK LEVELS OF SERVICE
ANALYSIS SUMMARY

Location Number	Segment	Segment Location	Summer 2005		Summer 2006		Summer 2007		Summer 2008		Summer 2009	
			ADT	Peak LOS	ADT	Peak LOS	ADT	Peak LOS	ADT	Peak LOS	ADT	Peak LOS
1	Palomar Airport Road	Paseo Del Norte and Armada Drive	51,285	A	53,378	A	53,175	A	49,570	A	48,758	A
2	Palomar Airport Road	Yarrow Drive and El Camino Real	32,154	A	32,960	A	33,820	A	33,523	A	30,786	A
3	Palomar Airport Road	El Camino Real and Loker Ave. W./Innovation Wy.	49,907	A	51,673	A	52,739	A	43,920	A	44,742	A
4	Palomar Airport Road	El Fuerte Street and Melrose Drive	----	----	----	----	----	----	42,287	A	40,819	A
5	Palomar Airport Road	Melrose Drive and Paseo Valindo/Eagle Drive	52,792	C	49,245	A	36,290	A	33,875	A	30,267	A
6	El Camino Real	Plaza Drive and Marron Road	36,540	A	30,832	A	31,375	A	26,713	A	26,401	A
7	El Camino Real	Tamarack Avenue and Kelly Drive	27,031	A	25,178	A	25,509	A	23,717	A	22,817	A
8	El Camino Real	Faraday Avenue and Palomar Airport Road	36,694	A	36,712	A	38,417	A	37,735	A	27,205	A
9	El Camino Real	Camino Vida Roble and Cassia Road	32,038	A	29,801	A	30,375	A	28,048	A	28,089	A
10	El Camino Real	Arenal Road and Costa Del Mar Road	47,753	A	47,091	A	50,905	C	43,213	A	44,112	A
11	El Camino Real	La Costa Avenue and Levante Street	37,279	A	36,097	A	39,105	A	31,933	A	33,325	A
12	El Camino Real	Levante Street and Calle Barcelona	36,340	A	36,413	A	39,367	A	31,275	A	31,399	A
13	Melrose Drive	Lionshead Avenue and Palomar Airport Road	----	----	----	----	25,995	A	22,637	A	22,794	A
14	Melrose Drive	Palomar Airport Road and Rancho Bravado	12,520	A	12,102	A	17,742	A	16,969	A	16,493	A
15	Melrose Drive	Alga Road and Corintia Street	----	----	16,476	A	20,880	A	18,667	A	18,822	A
16	Carlsbad Boulevard	Mountain View Drive and State Steet	15,669	A	14,868	A	13,985	A	12,065	A	13,334	A
17	Carlsbad Boulevard	Cannon Road and Cerezo Drive	19,780	B	19,034	A	18,163	A	15,485	A	16,378	A
18	Carlsbad Boulevard	Poinsettia Lane and Island Way	18,808	A	17,267	A	16,114	A	12,949	A	14,294	A
19	Carlsbad Boulevard	Avenida Encinas and La Costa Avenue	24,683	A	18,126	A	19,474	A	17,905	A	18,246	A
20	La Costa Avenue	Saxony Road and Piraeus Street	31,777	A	32,578	A	33,245	A	32,254	A	33,475	A
21	La Costa Avenue	Cadencia Street and Romeria Street	11,750	A	12,061	A	12,492	A	11,819	A	12,370	A
22	Rancho Santa Fe Road	La Costa Meadows Drive and San Elijo Road	30,853	C	30,516	A	34,674	A	31,222	A	25,313	A
23	Rancho Santa Fe Road	Avenida Soledad and Camino Junipero	35,763	A	36,589	A	39,947	A	35,754	A	35,678	A
24	Rancho Santa Fe Road	Olivenhain Road and Calle Acervo/Avenida La Posta	17,517	A	16,739	A	17,028	A	17,445	A	17,458	A
25	Carlsbad Village Drive	Victoria Avenue and Pontiac Drive	5,977	A	5,866	A	6,168	A	5,665	A	5,637	A
26	Poinsettia Lane	Paseo Del Norte and Batiquitos Drive	25,057	A	26,127	A	26,623	A	24,650	A	25,837	A
27	Tamarack Avenue	El Camino Real and La Portalada Drive	8,093	A	7,831	A	8,453	A	8,428	A	7,906	A
28	Paseo Del Norte	Camino Del Parque (North) and Palomar Airport Road	9,411	A	9,226	A	8,791	A	8,125	A	7,975	A
29	Paseo Del Norte	Palomar Airport Road and Car Country Drive	10,477	A	10,689	A	10,246	A	9,473	A	8,780	A
30	Cannon Road	Paseo Del Norte and Car Country Drive	24,071	A	25,052	A	22,778	A	21,709	A	23,284	A
31	Cannon Road	El Camino Real and College Boulevard	18,905	D	19,986	D	19,396	D	16,586	B	16,553	A
32	College Boulevard	Tamarack Avenue (North) and North City Limits	25,609	A	27,381	A	25,690	A	23,740	A	24,475	A
33	College Boulevard	Palomar Airport Road and Aston Avenue	13,761	A	14,484	A	13,718	A	13,810	A	13,992	A
34	Alga Road	Corintia Street and El Fuerte Street	12,784	A	----	----	11,482	A	10,632	A	10,216	A

Cannon Road between El Camino Real and College Boulevard was restriped from one lane in each direction in previous years to two lanes in 2009. This modification resulted in an improved LOS from LOS B to LOS A.

Thirty-four (34) of the mid-block link locations for this 2009 report were previously analyzed in the 2008 report. Of these thirty-four (34) locations, sixteen (16) link count stations experienced a decrease in ADT from the previous count period. The decreases ranged from less than one (1) percent to twenty-eight (28) percent with an average decrease of six (6) percent. The mid-block link at El Camino Real between Faraday Avenue and Palomar Airport Road showed the decrease of twenty-eight (28) percent due to construction related impacts during the period when this midblock was counted. The other eighteen (18) link count stations experienced an increase from the previous years counts. The increases ranged from less than one (1) percent to almost eleven (11) percent, with an average increase of about four (4) percent. Based on the thirty-four (34) comparative locations, overall traffic volumes have decreased by about five (5) percent during the last year.

The following are extension projects, which continue to change traffic patterns within the immediate vicinity of its respective project:

- The College Boulevard/Cannon Road extension projects were constructed in August 2004 prior to the 2005 count period
- The northerly extension of Melrose Drive at the intersection of Palomar Airport Road, which was completed after the traffic counts for the 2006 count season.
- The extension of Faraday Avenue from Orion Way to Melrose Drive opened to traffic in October 2007.

These extension projects now provide a direct connection to State Route 78 from Faraday Avenue, College Boulevard, Cannon Road and Melrose Drive without traveling through the intersection of El Camino Real and Palomar Airport Road. Prior to these connections, access to State Route 78 within the immediate project area was provided at the El Camino Real/State Route 78 interchange only.

Street improvements and alternate routes have again been implemented during this time period and none of the mid-block links operate worse than Level of Service A. This indicates that the numbers of through lanes provided on major roadways in the City of Carlsbad are generally appropriate for the prevailing traffic conditions. The following is a list of midblock locations, which experienced decreases fifteen (15) percent or higher.

Location	Segment	% decrease from year 2008
8	El Camino Real: Faraday Avenue to Palomar Airport Road	-28%
22	Rancho Santa Fe Road: La Costa Meadows Dr. to San Elijo Road	-19%

Due to the overall decrease in traffic volumes, which may be attributed to a number of factors including construction impacts, higher gas prices and the overall economic condition of the region, a review of the last five years of data from the year 2005 to present was conducted. Twenty-six (26) of the thirty-one (31) comparable locations have experienced a decrease, while five (5) have experienced an increase. These decreases ranged from less than one (1) percent to forty-two (42) percent, with the highest decreases occurring along Palomar Airport Road east of El Camino Real and El Camino Real north of Kelly Drive, experiencing an average decrease over the five (5) year period of more than forty-two (42) percent. The increases over the five-year period ranged from less than one (1) percent to thirty-two (32) percent, with the highest increase occurring along Melrose Drive between Palomar Airport Road and Rancho Bravado.

It is important to recognize that although mid-block link analysis is an accurate assessment of the number of through lanes provided on major street segments, roadway conditions in an urban setting are often determined by the operations at major intersections. Chapter 3 provides a description of intersection operations in Carlsbad in the Summer 2009 count period. In summary, the information in this chapter, coupled with the capacity analysis of signalized intersections in Chapter 3, will enable the City of Carlsbad to accurately determine the current state of the entire circulation system.

3. INTERSECTION TURN MOVEMENT COUNTS

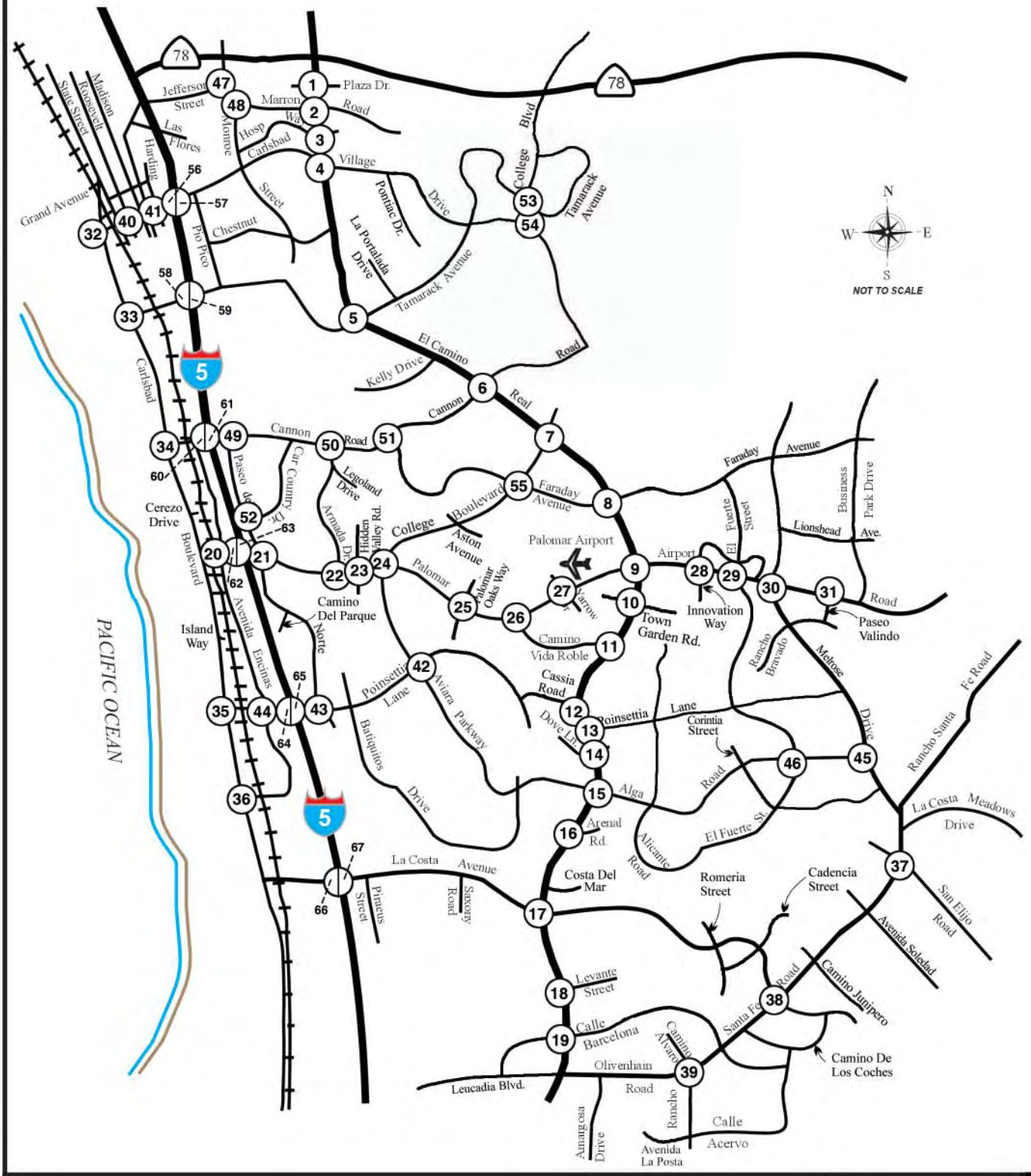
Intersection turn movement counts were conducted at sixty-seven (67) intersections. **Figure 3-1** graphically identifies the location of each of the intersections included in the study. The turn movement counts were conducted during the AM peak period (6:00 to 9:00 AM) and the PM peak period (3:30 to 6:30 PM). The data from each three-hour period was subdivided into fifteen-minute intervals, and vehicle turning movement counts were summarized during each interval. This assured that the peak hour would be clearly identified for both the AM and PM peak periods. All counts were conducted during the middle of the week (either Tuesday, Wednesday, or Thursday) and the actual count day(s) and date(s) are shown in the Appendix.

To aid in the reduction of the field data, Rick Engineering Company utilized an in-house computer software application program. The program utilizes an Excel spreadsheet to identify peak hour volume conditions and peak hour factors and perform ICU calculations. The ICU calculations for signalized intersections were conducted for both the AM and PM peak hours for all sixty-seven (67) intersections.

ICU calculations were performed based on the following lane group capacities:

Lane Group	**Capacity**
Thru Lanes	2000 vehicles per hour green per lane
Turn Lanes	1800 vehicles per hour green per lane
Dual Turn Lanes	1800 vehicles per hour green per lane

These lane group capacities were based on field studies conducted during the 1991 Traffic Monitoring Program with the exception of the Dual Turn Lanes capacity, which has been increased from 1620 to 1800 vehicles per hour green per lane, and implemented during the year 2000 Traffic Monitoring Program (TMP), based upon field studies.



2009 INTERSECTION LOCATION MAP

Figure 3-1

10/30/2009

Legend:

Count Locations

○ Intersection Count Location

XX Intersection Count Number

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The 2009 intersection ICU was correlated to the level of service for the sixty-seven (67) signalized locations as follows:

SIGNALIZED INTERSECTIONS
LEVEL OF SERVICE RANGES
(ICU Methodology)

Ratio	LOS
0.00 - 0.60	A
0.61 - 0.70	B
0.71 - 0.80	C
0.81 - 0.90	D
0.91 - 1.00	E
Greater than 1.00	F

It is important to note that the ICU procedure was developed for use at individual signalized intersections. At locations where traffic volumes are heavy, it is possible for traffic waiting at a signalized intersection to back up into nearby adjacent intersections. When this occurs, drivers may experience additional delay. The ICU procedure does not address this situation. Instead, the ICU procedure reports the level of service at each intersection as if there were no traffic backups from adjacent intersections. Based on observations of traffic along the street system in Carlsbad, traffic backups from adjacent intersections tend to occur in the area of Palomar Airport Road east of Interstate Highway 5, Cannon Road east of Interstate 5 and in the area of El Camino Real south of State Route 78. In these areas, the results of the ICU procedure should be used with the knowledge that the procedure may report better results than are actually achieved. For certain types of analyses, it may be desirable to utilize intersection capacity procedures more detailed than the ICU procedure that are designed to analyze systems of signalized intersections.

In previous years, unsignalized minor-street stop-controlled intersections were included in the Traffic Monitoring Program. However, no unsignalized intersections were analyzed for the 2009 Traffic Monitoring Program.

The following observations were made during the course of the 2009 count program:

- The Traffic Monitoring Program intersections along El Camino Real between State Route 78 and Cannon Road have continued to result in improved operations levels due to reduced daily and peak hour volumes along these segments. This is partly due to the College Boulevard, Cannon Road and Melrose Drive extension projects that now provide an alternate connection to State Route 78. Also, with traffic volumes down overall in the City of Carlsbad, it is reasonable to assume that less traffic is accessing State Route 78 in the northern portion of the City.

- 2009 is the first year that the intersections of Cannon Road and Faraday Avenue, Paseo del Norte and Car Country Drive were counted/analyzed as part of the Traffic Monitoring Program.
- This is the third year in more than ten years that the intersection of El Camino Real and Palomar Airport Road has operated at Level of Service C or better. This is partially due to the completion of the College Boulevard/Cannon Road extension projects as well as the northerly extension of Melrose Drive at the intersection of Palomar Airport Road and the extension of Faraday Avenue to Melrose Drive, which continue to change traffic patterns within their immediate project areas.

After analyzing the results of the Summer 2009 count season, four (4) intersections were identified as operating at a low to high LOS D during the AM or PM peak hours (No intersections were calculated to operate at LOS E or F):

Location #	Intersection	ICU	LOS	Period
6	El Camino Real and Cannon Road	0.88	D	PM peak
17	El Camino Real and La Costa Avenue	0.84	D	PM peak
30	Palomar Airport Road and Melrose Drive	0.82	D	AM peak
63	I-5/Palomar Airport Road Northbound Ramps	0.81	D	PM peak

The ICU and LOS for the Summer count seasons of 2005 through 2009 are summarized in **Table 3-1**. In addition, **Figure 3-2** and **Figure 3-3** graphically illustrate the intersection Levels of Service for the AM and PM peak periods, respectively. A discussion of traffic operations at the four (4) intersections identified as operating at LOS D and LOS E are as follows:

El Camino Real and Cannon Road (#6)

This intersection is operating at a high LOS D and has operated at a mid to high LOS D since 2005 in the PM peak hour ranging from ICU ratio of 0.85 to 0.88, with the exception of 2008 where the ICU ratio was 0.72 at LOS C. This year's ICU ratio increased in the PM to an ICU ratio of 0.88 LOS D during the PM peak hour. The primary reason for this year's high LOS D is an increase in the northbound right turn volumes in the PM peak hour. With northbound right-turn volumes counted at over 1,000 vehicles per hour, a recommendation to consider is to modify the signal operations and phasing to provide for a northbound to eastbound right-turn overlap. This would improve the overall operations at this location during the PM peak hour. Westbound prohibition of U-turns would be required.

El Camino Real and La Costa Avenue (#17)

This intersection is operating at a mid LOS D. The ICU ratio has been increasing every year since 2005 during the PM peak hours ranging from 0.62 (LOS B) to 0.84 (LOS D). This year's ICU ratio increased in the PM to an ICU ratio of 0.84 LOS D during the PM peak hour. The primary reason for this year's

LOS D is an increase in the southbound right-turn movement during the PM peak hour. This movement should be continued to be monitored for significant increases (counted at over 800 vehicles per hour in 2009). A recommendation to consider is to modify the signal operations and phasing to provide for a southbound to westbound right-turn overlap. However, it should be noted that the elimination of the eastbound U-turn movement at this intersection would also have to be prohibited to avoid vehicular conflicts.

Palomar Airport Road and Melrose Drive (#30)

This intersection is currently operating at a high LOS D during the AM peak hour (ICU ratio of 0.82). This intersection has averaged operating between a mid LOS B and LOS C in the previous five years with the exception of the 2007 AM peak hour when it operated at a low LOS D of 0.82. This year's ICU ratio increase during the AM peak hour is due to both the restriping of the southbound approach from two southbound right-turn lanes to a single southbound right-turn lane and the high traffic volumes for the southbound right-turn movement (over 850 vehicles per hour counted during the AM peak hour). This approach was restriped within the past year to accommodate a third southbound through lane at this intersection.

The increase in the southbound right turn volumes during the AM peak hour, which contributed to the level of service determination, may have been the result of construction occurring in the vicinity of Faraday Avenue and El Camino Real. This construction activity during the study period may have led commuters from the Faraday Avenue corridor to the Palomar Airport Road corridor, resulting in an increase in the southbound right turn volumes at Melrose Drive and Palomar Airport Road.

The southbound approach of this intersection (primarily the southbound right turn movement) should continue to be monitored for any significant degradation in intersection operations. If overall intersection operations begin to approach LOS E, it is recommended that the southbound approach be modified to add a second southbound right-turn lane. This would improve operations at this intersection to LOS B during the AM peak hour.

I-5/Palomar Airport Road Northbound Ramps (#63)

This intersection is operating at a low LOS D and has not operated above a low LOS C since the year 2006 in the PM peak hour with an ICU ratio of 0.73. This year's ICU ratio increased in the PM to an ICU ratio of 0.81 LOS D during the PM peak hour. The primary reason for this year's LOS D is an increase in the eastbound left-turn and conflicting westbound through volumes in the PM peak hour. It is recommend that these movements continue to be monitored for significant volume increases. Currently there are no immediate or future plans for Caltrans to improve this intersection/interchange.

Table 3-1
INTERSECTION CAPACITY UTILIZATION ANALYSIS SUMMARY

Count #	Count Intersection/Location	SUMMER 2005 PEAK HOUR				SUMMER 2006 PEAK HOUR				SUMMER 2007 PEAK HOUR				SUMMER 2008 PEAK HOUR				SUMMER 2009 PEAK HOUR			
		AM		PM		AM		PM		AM		PM		AM		PM		AM		PM	
		ICU Ratio	LOS	ICU Ratio	LOS	ICU Ratio	LOS	ICU Ratio	LOS	ICU Ratio	LOS	ICU Ratio	LOS	ICU Ratio	LOS	ICU Ratio	LOS	ICU Ratio	LOS	ICU Ratio	LOS
1	El Camino Real & Plaza Drive	0.33	A	0.71	C	0.34	A	0.60	A	0.35	A	0.65	B	0.34	A	0.65	B	0.30	A	0.61	B
2	El Camino Real & Marron Road	0.38	A	0.52	A	0.35	A	0.53	A	0.37	A	0.55	A	0.35	A	0.49	A	0.35	A	0.50	A
3	El Camino Real & Hosp Way	0.38	A	0.43	A	0.37	A	0.45	A	0.37	A	0.45	A	0.35	A	0.41	A	0.34	A	0.42	A
4	El Camino Real & Carlsbad Village Drive	0.50	A	0.58	A	0.44	A	0.52	A	0.49	A	0.63	B	0.44	A	0.57	A	0.42	A	0.55	A
5	El Camino Real & Tamarack Avenue	0.75	C	0.58	A	0.69	B	0.58	A	0.67	B	0.58	A	0.67	B	0.55	A	0.61	B	0.59	A
6	El Camino Real & Cannon Road	0.68	B	**0.88**	**D**	0.65	B	**0.85**	**D**	0.66	B	**0.85**	**D**	0.59	A	0.72	C	0.62	B	**0.88**	**D**
7	El Camino Real & College Boulevard	0.61	B	0.58	A	0.61	B	0.58	A	0.57	A	0.57	A	0.58	A	0.58	A	0.56	A	0.57	A
8	El Camino Real & Faraday Avenue	0.68	B	0.77	C	0.69	B	0.73	C	0.70	B	0.75	C	0.66	B	0.65	B	0.60	A	0.68	B
9	El Camino Real & Palomar Airport Road	0.66	B	**0.82**	**D**	0.68	B	**0.81**	**D**	0.68	B	0.77	C	0.55	A	0.75	C	0.54	A	0.78	C
10	El Camino Real & Town Garden Road	0.35	A	0.43	A	0.35	A	0.43	A	0.38	A	0.46	A	0.39	A	0.41	A	0.39	A	0.47	A
11	El Camino Real & Camino Vida Roble	0.41	A	0.55	A	0.40	A	0.62	B	0.38	A	0.59	A	0.42	A	0.56	A	0.41	A	0.55	A
12	El Camino Real & Cassia Road	0.53	A	0.53	A	0.52	A	0.51	A	0.58	A	0.62	B	0.59	A	0.56	A	0.59	A	0.55	A
13	El Camino Real & Poinsettia Lane	----	----	----	----	0.35	A	0.57	A	0.40	A	0.56	A	0.34	A	0.54	A	0.38	A	0.54	A
14	El Camino Real & Dove Lane	0.34	A	0.55	A	0.34	A	0.54	A	0.38	A	0.59	A	0.37	A	0.59	A	0.36	A	0.59	A
15	El Camino Real & Alga Road / Aviara Parkway	0.68	B	**0.81**	**D**	0.63	B	0.77	C	0.75	C	0.72	C	0.55	A	0.73	C	0.68	B	0.76	C
16	El Camino Real & Arenal Road	0.65	B	0.75	C	0.67	B	0.77	C	0.63	B	0.73	C	0.62	B	0.73	C	0.63	B	0.71	C
17	El Camino Real & La Costa Avenue	0.57	A	0.62	B	0.72	C	0.64	B	0.70	B	0.74	C	0.63	B	0.77	C	0.78	C	**0.84**	**D**
18	El Camino Real & Levante Street	0.47	A	0.48	A	0.45	A	0.49	A	0.44	A	0.50	A	0.39	A	0.50	A	0.41	A	0.52	A
19	El Camino Real & Calle Barcelona	0.50	A	0.52	A	0.51	A	0.56	A	0.52	A	0.58	A	0.46	A	0.62	B	0.48	A	0.60	A
20	Palomar Airport Road & Avenida Encinas	0.52	A	0.75	C	0.55	A	0.72	C	0.53	A	0.70	B	0.51	A	0.80	C	0.57	A	0.74	C
21	Palomar Airport Road & Paseo del Norte	0.61	B	0.73	C	0.63	B	0.79	C	0.60	A	0.72	C	0.59	A	0.67	B	0.60	A	0.70	B
22	Palomar Airport Road & Armada Drive / Costco Entrance	0.50	A	0.71	C	0.51	A	0.73	C	0.53	A	0.66	B	0.56	A	0.70	B	0.52	A	0.69	B
23	Palomar Airport Road & Hidden Valley Road/The Crossings Drive	----	----	----	----	0.50	A	0.62	B	0.54	A	0.57	A	0.52	A	0.65	B	0.53	A	0.67	B
24	Palomar Airport Road & College Boulevard/Aviara Parkway	0.61	B	0.68	B	0.53	A	0.69	B	0.62	B	0.70	B	0.59	A	0.72	C	0.54	A	0.72	C
25	Palomar Airport Road & Palomar Oaks Way	----	----	----	----	----	----	----	----	----	----	----	----	0.44	A	0.52	A	0.40	A	0.44	A
26	Palomar Airport Road & Camino Vida Roble	0.51	A	0.49	A	0.54	A	0.57	A	0.53	A	0.53	A	0.52	A	0.53	A	0.49	A	0.54	A
27	Palomar Airport Road & Yarrow Drive	0.45	A	0.52	A	0.47	A	0.49	A	0.47	A	0.51	A	0.50	A	0.56	A	0.42	A	0.55	A
28	Palomar Airport Road & Loker Avenue West/Innovation Way	----	----	----	----	----	----	----	----	----	----	----	----	0.75	C	0.68	B	0.66	B	0.76	C
29	Palomar Airport Road & El Fuerte Street	0.76	C	0.64	B	0.78	C	0.67	B	0.73	C	0.71	C	0.63	B	0.61	B	0.52	A	0.66	B
30	Palomar Airport Road & Melrose Drive	0.54	A	0.73	C	0.65	B	0.75	C	**0.82**	**D**	0.71	C	0.68	B	0.68	B	**0.82**	**D**	0.64	B
31	Palomar Airport Road & Paseo Valindo/Eagle Drive	0.59	A	0.67	B	0.67	B	0.67	B	0.49	A	0.52	A	0.46	A	0.52	A	0.42	A	0.49	A
32	Carlsbad Boulevard & Carlsbad Village Drive	0.37	A	0.61	B	0.38	A	0.57	A	0.30	A	0.59	A	0.29	A	0.57	A	0.29	A	0.56	A
33	Carlsbad Boulevard & Tamarack Avenue	0.45	A	0.56	A	0.43	A	0.61	B	0.44	A	0.56	A	0.41	A	0.46	A	0.35	A	0.59	A

Table 3-1 (Continued)
INTERSECTION CAPACITY UTILIZATION ANALYSIS SUMMARY

Count #	Count Intersection/Location	SUMMER 2005 PEAK HOUR				SUMMER 2006 PEAK HOUR				SUMMER 2007 PEAK HOUR				SUMMER 2008 PEAK HOUR				SUMMER 2009 PEAK HOUR			
		AM		PM		AM		PM		AM		PM		AM		PM		AM		PM	
		ICU Ratio	LOS	ICU Ratio	LOS	ICU Ratio	LOS	ICU Ratio	LOS	ICU Ratio	LOS	ICU Ratio	LOS	ICU Ratio	LOS	ICU Ratio	LOS	ICU Ratio	LOS	ICU Ratio	LOS
34	Carlsbad Boulevard & Cannon Road	0.62	B	**0.81**	**D**	0.70	B	0.80	C	0.49	A	0.77	C	0.35	A	0.69	B	0.38	A	0.69	B
35	Carlsbad Boulevard & Poinsettia Lane	0.49	A	0.51	A	0.48	A	0.42	A	0.53	A	0.52	A	0.26	A	0.26	A	0.32	A	0.31	A
36	Carlsbad Boulevard & Avenida Encinas	----	----	----	----	----	----	----	----	0.44	A	0.50	A	0.30	A	0.32	A	0.35	A	0.33	A
37	Rancho Santa Fe Road & San Elijo Road	0.67	B	0.75	C	0.51	A	0.52	A	0.51	A	0.62	B	0.51	A	0.69	B	0.50	A	0.75	C
38	Rancho Santa Fe Road & La Costa Avenue	0.64	B	0.57	A	0.58	A	0.56	A	0.63	B	0.62	B	0.60	A	0.62	B	0.63	B	0.60	A
39	Rancho Santa Fe Road & Olivenhain Road/Camino Alvaro	0.68	B	0.77	C	0.80	C	0.73	C	0.73	C	**0.81**	**D**	0.67	B	0.75	C	0.56	A	0.73	C
40	Carlsbad Village Drive & State Street	0.24	A	0.38	A	0.25	A	0.39	A	0.24	A	0.37	A	0.25	A	0.37	A	0.25	A	0.37	A
41	Carlsbad Village Drive & Harding Street	0.35	A	0.54	A	0.40	A	0.52	A	0.34	A	0.54	A	0.33	A	0.53	A	0.34	A	0.54	A
42	Poinsettia Lane and Aviara Parkway	0.41	A	0.50	A	0.43	A	0.55	A	0.44	A	0.54	A	0.42	A	0.52	A	0.43	A	0.53	A
43	Poinsetta Lane & Paseo del Norte/Lowder Lane	0.50	A	0.67	B	0.52	A	0.66	B	0.57	A	0.64	B	0.55	A	0.65	B	0.54	A	0.65	B
44	Poinsetta Lane & Avienda Encinas	0.42	A	0.74	C	0.39	A	0.58	A	0.42	A	0.61	B	0.44	A	0.62	B	0.47	A	0.70	B
45	Alga Road & Melrose Drive	0.48	A	0.54	A	0.50	A	0.66	B	0.53	A	0.67	B	0.48	A	0.56	A	0.44	A	0.56	A
46	Alga Road & El Fuerte Street	0.31	A	0.34	A	----	----	----	----	0.25	A	0.34	A	0.24	A	0.30	A	0.24	A	0.29	A
47	Jefferson Street & Marron Road	0.37	A	0.62	B	0.39	A	0.59	A	0.33	A	0.58	A	0.38	A	0.63	B	0.39	A	0.57	A
48	Monroe Street & Marron Road	0.26	A	0.41	A	0.23	A	0.35	A	0.24	A	0.37	A	0.23	A	0.35	A	0.20	A	0.34	A
49	Cannon Road & Paseo Del Norte	0.64	B	0.54	A	0.69	B	0.54	A	0.59	A	0.50	A	0.57	A	0.50	A	0.52	A	0.48	A
50	Cannon Road & LEGOLAND Drive	----	----	----	----	----	----	----	----	----	----	----	----	0.41	A	0.48	A	0.36	A	0.45	A
51	Cannon Road & Faraday Avenue	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	0.37	A	0.54	A
52	Paseo Del Norte & Car Country Drive	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	0.23	A	0.31	A
53	College Boulevard & Tamarack Avenue (S)	0.42	A	0.58	A	0.52	A	0.61	B	0.50	A	0.56	A	0.44	A	0.51	A	0.51	A	0.52	A
54	College Boulevard & Carlsbad Village Drive/Peninsula Drive	----	----	----	----	0.43	A	0.61	B	0.52	A	0.57	A	0.48	A	0.48	A	0.54	A	0.49	A
55	College Boulevard & Faraday Avenue	0.39	A	0.41	A	----	----	----	----	0.44	A	0.48	A	0.44	A	0.50	A	0.45	A	0.47	A
56	I-5/Carlsbad Village Drive Southbound Ramps	0.52	A	0.79	C	0.53	A	0.77	C	0.49	A	0.74	C	0.46	A	0.63	B	0.52	A	0.77	C
57	I-5/Carlsbad Village Drive Northbound Ramps	0.55	A	0.66	B	0.52	A	0.72	C	0.49	A	0.72	C	0.52	A	0.69	B	0.53	A	0.69	B
58	I-5/Tamarack Avenue Southbound Ramps	0.56	A	0.49	A	0.46	A	0.48	A	0.53	A	0.45	A	0.46	A	0.53	A	0.50	A	0.49	A
59	I-5/Tamarack Avenue Northbound Ramps	0.55	A	0.61	B	0.45	A	0.59	A	0.45	A	0.57	A	0.44	A	0.61	B	0.43	A	0.59	A
60	I-5/Cannon Road Southbound Ramps	0.50	A	0.54	A	0.51	A	0.43	A	0.50	A	0.45	A	0.51	A	0.48	A	0.48	A	0.43	A
61	I-5/Cannon Road Northbound Ramps	0.56	A	0.54	A	0.55	A	0.57	A	0.52	A	0.57	A	0.49	A	0.56	A	0.46	A	0.54	A
62	I-5/Palomar Airport Road Southbound Ramps	0.51	A	0.45	A	0.49	A	0.49	A	0.49	A	0.50	A	0.47	A	0.51	A	0.50	A	0.48	A
63	I-5/Palomar Airport Road Northbound Ramps	0.64	B	0.68	B	0.72	C	0.73	C	0.70	B	0.75	C	0.66	B	0.72	C	0.70	B	**0.81**	**D**
64	I-5/Poinsettia Lane Southbound Ramps	0.39	A	0.67	B	0.46	A	0.68	B	0.49	A	0.53	A	0.46	A	0.53	A	0.48	A	0.58	A
65	I-5/Poinsettia Lane Northbound Ramps	0.58	A	0.56	A	0.61	B	0.54	A	0.61	B	0.49	A	0.54	A	0.58	A	0.52	A	0.53	A
66	I-5/La Costa Avenue Southbound Ramps	0.55	A	0.48	A	0.51	A	0.52	A	0.56	A	0.54	A	0.53	A	0.54	A	0.62	B	0.58	A
67	I-5/La Costa Avenue Northbound Ramps	0.60	A	0.48	A	0.58	A	0.59	A	0.65	B	0.65	B	0.60	A	0.70	B	0.63	B	0.65	B

2009 AM PEAK HOUR INTERSECTION LEVELS OF SERVICE

Figure 3-2

10/30/2009

Legend:

XX Intersection Count Location

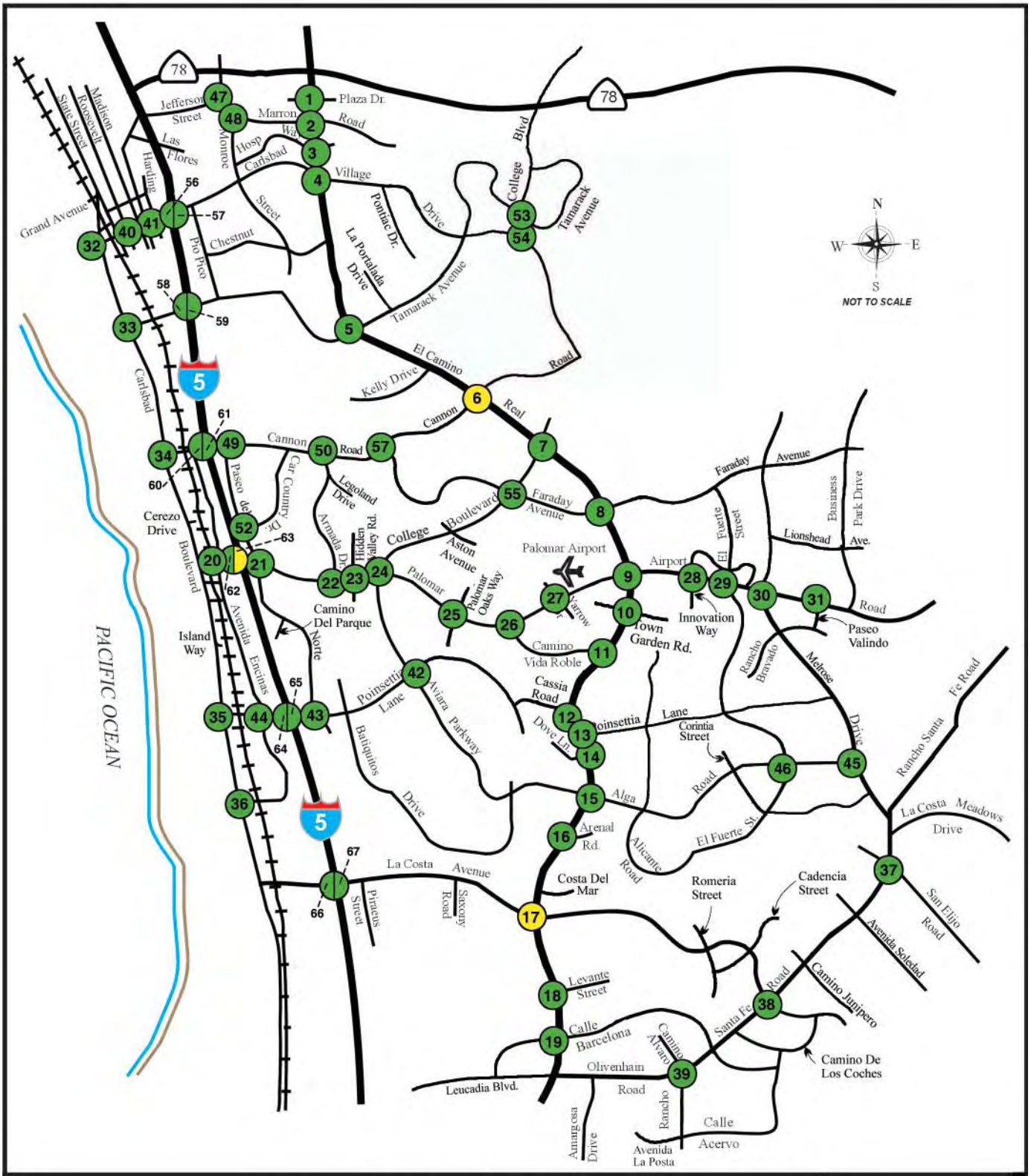
LOS A, B or C

LOS D

LOS E

LOS F

RICK ENGINEERING COMPANY



2009 PM PEAK HOUR INTERSECTION LEVELS OF SERVICE

Figure 3-3

10/30/2009

Legend:

XX Intersection Count Location

LOS A, B or C

LOS D

LOS E

LOS F

RICK ENGINEERING COMPANY

4. CONCLUSIONS

The scope of work for this project was developed to allow the City of Carlsbad to monitor growth at several intersections and mid-block locations that have been studied since 1989, as well as monitor new locations. Sixty-five (65) out of sixty-seven (67) intersections and all thirty-four (34) mid-block link locations have been studied in previous Traffic Monitoring Reports.

The results of the mid-block link counts indicate that overall traffic has decreased by an average of five (5) percent from last year. All roadway segments were calculated to operate at LOS A. Cannon Road between El Camino Real and College Boulevard segment was restriped from one lane in each direction to two lanes this year, thus improving operations from LOS B to LOS A.

The information contained in Chapter 3 identifies four (4) critical intersections from the sixty-seven (67) study locations operating at LOS D:

Location #	Intersection	ICU	LOS	Period
6	El Camino Real and Cannon Road	0.88	D	PM peak
17	El Camino Real and La Costa Avenue	0.84	D	PM peak
30	Palomar Airport Road and Melrose Drive	0.82	D	AM peak
63	I-5/Palomar Airport Road Northbound Ramps	0.81	D	PM peak

Suggestions for improvement of this intersection are described in Chapter 3. The remaining signalized intersections were found to have acceptable levels of services. It can be concluded that operations at these remaining intersections may require periodic monitoring and additional geometric analysis.

In conclusion, this report was developed for the City of Carlsbad as the twenty-first annual Traffic Monitoring Program for the Growth Management Plan. Critical intersections have been identified and potential mitigation measures have been discussed. The intent of this document is to provide City staff with an indication of the current status of the overall circulation system in terms of intersection and segment capacities and Levels of Service. This report will also be used as a tool for the accurate identification of conditions in specific areas of the City and to identify critical locations that warrant close attention in the future. The City may utilize the conclusions of this report to aid in the creation of a future scope of work for additional traffic monitoring.